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CAPACITOR AND FABRICATION METHOD USING ULTRA-HIGH VACUUM CVD OF SILICON NITRIDE

Abstract

A method of fabricating a capacitor including an ultra-high vacuum chemical vapor deposition (UHVCVD) step to generate a top-side barrier film layer including silicon nitride at monolayer quantities, and a capacitor so formed, are disclosed. The UHVCVD step allows silicon nitride to be deposited with monolayer level control, and is more successful at placing the nitrogen near the top surface independent of the base film thickness. The resulting capacitor exhibits thermal stability and meets leakage targets after, for example, an approximately 1050°C thermal treatment. In addition, the UHVCVD nitride step allows for an in situ thermal clean and simpler process control because the reaction is thermally driven.